raised as a pedicle flap and draped over the cartilage framework. This is covered with a thick split-thickness skin graft. Because of its filmy and highly vascularized nature, the temporoparietal fascia both conforms beautifully to the cartilaginous foundation and serves as a reliable vascularized bed for both the cartilage and the overlying skin graft.

Brent has reported an extensive experience with this procedure and notes the operation to be extremely dependable with minimal complications. Other centers have had similar favorable results.

Repair of congenital contour ear deformities without tissue shortage in midchildhood or later is a difficult surgical procedure with mixed results. Recent reports by Matsuo and co-workers from Japan have shown the efficacy of correcting auricular deformities in the neonate by nonsurgical methods. Prominent ears, cup and lop ears and other abnormal shapes are corrected by combining molding and tape splints. This must be initiated immediately postpartum and held for about four weeks for the cartilage to be permanently reshaped. The procedure requires skilled application and careful monitoring to be effective and still avoid complications such as tissue necrosis.

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Suction-Assisted Lipectomy, Suction Lipectomy, Lipolysis and Lipexeresis

THE TERMS suction lipectomy, lipolysis and lipexeresis are applied to a surgical procedure commonly known as "fat suctioning." Over the past two or three years the lay press has extolled its virtues for the treatment of "cellulite."

Historically, this technique is an offshoot of a curettement technique through a small incision. First made popular by Schrudde of Cologne, West Germany, in the early 1960s, this technique consisted of using a small incision and curetting out, through a tunnel made with a long pair of scissors, the fat of primarily the hips, knees, thighs and ankles. Dr Schrudde currently uses a suction cannula.

The surgeon who deserves the credit for developing the suction cannula is Ulrich Kesselring of Lausanne, Switzerland. Beginning in the 1970s Dr Kesselring used a relatively large cannula with a large aperture for carving the fat. His results have been excellent with minimal complications.

In 1977 Yves-Gerard Illouz of Paris began using a smaller type suction cannula with a high vacuum suction of about 743 mm of mercury. With this technique, large areas have been done with minimal complications such as seroma, hematoma and skin loss.

The technique is designed primarily for localized deformities such as the "riding britches syndrome," the "saddlebag deformity," bulging of the medial aspect of the knees and bulging of the abdomen, around the waistline in the flank and in the axilla and the chin. These areas have all responded well to the suction technique, the only scar being the puncture site, usually in one of the normal skin folds. The results in patients with good skin turgor and good fat density have been exceedingly gratifying.

Surprisingly, this procedure lends itself well to refinements and enhancement of normal aesthetic body contouring procedures such as abdominoplasty and thigh reduction by allowing a surgeon to minimize the extent of the dissection and length of the incision. In an abdominoplasty, deepening of the midline raphe by suction-assisted lipectomy gives a patient a more youthful appearance to the abdomen. The usual dog-ears in the traditional operation can often be eliminated without extending the incisions well over into the hip and flank area. We have also found it very useful in a facelift where suctioning the fatty tissue of the neck is accomplished and in breast reduction where there is fullness of the axilla.

Suction-assisted lipectomy has been of further benefit in many of the reconstructive operations using free flaps or transposed flaps that have irregular contour fitting. There symmetry can be improved after the wounds have healed. It has also been useful in aspirating some areas that have been injected with liquid silicone. In addition, a number of lipomas have been removed successfully using a suction cannula.

Future research with this technique may offer some help to obese and diabetic patients. Currently suction-assisted lipectomy is a useful technique in repairing local deformities and in conjunction with traditional body-contouring operations to enhance their results.

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Noninvasive Monitoring of Tissue Viability

SIMPLE AND accurate methods for predicting tissue survival will be increasingly important as reconstructive procedures reach new horizons. Work in our laboratory and others has been improving noninvasive monitoring methods.

One notable method is the use of a surface fluorometer (Fluoroscan). Blue light is transmitted to the skin surface through a flexible fiberoptic pathway. Fluorescein molecules present in the skin emit yellow-green fluorescence that is carried back through the same fiberoptic pathway and converted to a digital readout. Graham and co-workers have shown that this instru-

ment is 500 times more sensitive than the human eye using a Wood's lamp. They have also shown that the Fluoroscan is able to predict skin-flap survival in rats. In clinical and experimental studies, we have found it simple and reliable, using less than a tenth the dose of fluorescein we had formerly used for visual assessment with a Wood's lamp. Testing may be easily repeated at frequent intervals.

Another method is transcutaneous oxygen partial pressure (Po_2) monitoring. Monitoring devices measure alterations of current in a polarographic cell induced by changes in Po_2. Most units contain a simple heating element to produce vasodilatation in the area being monitored. Thermal burns are therefore possible with prolonged monitoring at higher temperatures. Instruments that function at lower temperatures should eliminate this danger. Smith and associates have reported their experience with 65 replantations and 18 free tissue transfers. In failing replantations or free tissue transfers, changes in Po_2 appeared several hours earlier than clinical changes or temperature changes. Our own experience has been similar.

With the increasing complexity of major reconstructive surgical procedures, we feel that these and additional noninvasive tissue monitoring techniques will have increasing clinical importance and applicability.

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Applications of Free Flaps

MICROSURGICAL ANASTOMOSIS of small vessels has become an indispensable method of transferring living tissue for reconstruction. Continuing investigation of the circulatory anatomy of skin, muscle, fascia and bone is expanding the repertoire of donor sites and treatable problems. The overall success rate of transfers of free vascularized tissue exceeds 95% when performed by experienced teams. Microsurgical training is now a part of most plastic surgery residencies, and additional training is available through active fellowship programs.

There are two areas of free flap applications: wound closure and reconstruction. Wound closure applications were discussed in the plastic surgery "Epitome" series in the June 1982 issue. As an update, free flaps are being most regularly used in closing defects due to a surgical procedure, trauma, irradiation or infection where local flaps are unsuitable, unavailable or will not heal. Heretofore-untreatable wounds can now be reliably closed in one stage. For problem wounds of the foot and the distal third of the leg, where muscle mass is sparse and cutaneous circulation is poor, closure with free flaps is now considered the treatment of choice.

Free flaps have permitted ever-increasing possibilities for reconstructive procedures. These applications include the following:

Skin. Thin flaps of skin alone can be transferred on direct cutaneous arteries to restore stability to large unstable scars. Some skin flaps (mostly from the back and extremities) have an identifiable sensory nerve that can be used to restore sensibility and are useful for reconstructing palmar and plantar defects.

Soft tissue. Serious soft tissue defects of the face due to injury, irradiation, hemifacial atrophy and craniofacial anomalies can be corrected. Flaps of muscle, omentum and de-epithelialized skin are used. For women who do not tolerate prostheses, free flaps of abdominal or buttock skin and fat have been used for breast reconstruction.

Muscle. Palsies of the face and hands, of many causes, can be reanimated by vascularized muscle transfers with motor neurorrhaphy. The gracilis and foot muscles have been the most useful.

Skeleton. Management of large skeletal defects has been improved by the realization that bone healing is superior with vascularized rather than conventional grafts. Vascularized grafts of rib, ilium, fibula, scapula and metatarsal are often the preferred treatment for many defects of the mandible, femur, tibia and upper extremity.

Viscera. Defects of viscera, such as pharynx, trachea and ureter, have been reconstructed experimentally and clinically with transfers of soft tissues or other viscera such as jejunum or appendix. Many of these have been singular cases, but the value of pharyngoesophageal reconstruction with jejunum or colon has been established.

The most important recent development is the custom design of free flaps. Isolated vessels can be transposed underneath an otherwise random flap. As healing occurs, vascular continuity is established between flap and pedicle and the entire unit can then be transferred. This has been successful experimentally and clinically.

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Use of Nasendoscopy in the Treatment of Velopharyngeal Insufficiency

PERSISTENT VELOPHARYNGEAL INSUFFICIENCY is variously described as occurring in up to 20% of any series following closure of a hard- or soft-palate cleft. Since 1876 the treatment of choice—though recently challenged by pharyngoplasty—has been creation of a pharyngeal flap. Though overall success following a